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Abstract

In November 2005, 55.7 percent of 2 million Swiss voters approved a 5-year moratorium (ban) on the commercial cultivation of genetically modified (GM) plants within Switzerland. The present study examines how individual voting decisions were determined by (i) socioeconomic characteristics, (ii) political preference/ideology and (iii) agreement with a series of arguments in favour and against the use of GM plants in Swiss agriculture. The analysis is based on the data of the regular voter survey undertaken after national-level voting decisions in Switzerland. Among the socioeconomic characteristics, only the age group was clearly significant with individuals above 65 years less opposed to crop biotechnology. Several political preference/ideology variables were significant determinants of the vote, most notably the preferences about the role of the state in the economy. Perceived consequences of the use of GM plants for health, natural diversity of plants and animals were also strongly and significantly associated with approving and disapproving voter groups. The disapproving votes were not motivated by perceived benefits of GM-food production but mainly by perceived interests of Swiss science and industry. Our findings suggest that current concerns about the use of genetically engineered plants in agriculture may not automatically decrease with higher levels of education/knowledge and generational change. Furthermore, the analysis of the voter motives suggests that the public support for GM-free agricultural production would be even larger in other countries, where industrial interests in crop biotechnology are less pronounced.

Keywords: Externalities, genetically modified organisms (GMO), public goods, voting

JEL codes: D62, D72, Q26

1 Introduction

In recent years, much research has been devoted to estimating consumer demands for genetically modified (GM) food. In a meta-analysis of that research, Lusk et al. (2005) found that, on average, American consumers were willing to pay a premium of 26 percent and European consumers a premium of 33 percent for non-GM processed foods compared with processed foods not containing GM ingredients. Such estimates of willingness-to-pay premiums for non-GM foods are an important piece of information needed to create appropriate public policy regulating the declaration of GM foods, as for instance by mandatory labelling (Lusk et al 2006).

However, willingness-to-pay premiums for non-GM foods represent only one component of individuals' preferences about the use of genetically engineered plants and animals in food production. Apart from the preferences for the private consumption of GM goods, there are the preferences for the indivisible or public-good aspects of GM food. In economic terminology, these preferences relate to the *externalities* of GM food production which may be independent of individual consumption decisions. For example, both consumers and non-consumers of GM foods may have preferences for GM-free food production due to animal, environmental, ethical, or other reasons. From an economic perspective information about these preferences would be an important basis for efficient public policies regulating the production of GM foods (Kysar 2004, Carlsson et al. 2007).

While measuring the willingness-to-pay premiums for the private-good aspects of non-GM food has proven feasible in a large number of recent experiments, estimating the preferences for the public-good aspects of GM-free production is more difficult. These preferences cannot be observed on markets for GM foods. Studies about public-good values of GM-free production are therefore virtually absent (Table 1). The limited information currently available stems from stated preference approaches which unfortunately involve large uncertainties related to strategic answering and adequate information provision (e.g. McFadden 1999, Schläpfer and Hanley 2006). Information provision is particularly problematic in preference surveys about highly controversial issues since even minor changes in the type and extent of information provided may strongly affect the responses (Rousu et al. 2007).

An alternative source of information about preferences for public goods is from referendum decisions (Deacon and Shapiro 1975). The advantage of referendum-based

preference information is that the choices are real and the voters are exposed to an open competition of arguments that follows democratically established procedures. The present study fills an important gap in the literature by analyzing consumer preferences for public-good aspects of GM-free food production expressed in a binding referendum. The unique opportunity for this analysis is afforded by a Swiss voting decision held in November 2005 specifically and exclusively on the question of whether there should be a 5-year moratorium (ban) of the commercial cultivation of GM crops in Switzerland.

The present study uses the results of a voter survey to analyze the voter preferences in the referendum. Specifically it examines how individual votes were associated with (i) socioeconomic characteristics, (ii) a set of more general political preferences, and (iii) the responses to a set of questions about the perception of various arguments in favour and against the initiative.

2 Materials and methods

2.1 The vote

Switzerland is the only country so far where citizens have been asked to express their preferences for or against the agricultural use of genetically engineered plants in a binding vote at the national level. The vote was put on the ballot by environmental and consumer organizations who had launched an initiative proposing a five-year moratorium (ban) on the use of GM crops in February 2003 (BBl 2003 1126) and had submitted within much less than the maximum allowed time of 18 months the constitutionally required number of 100,000 signatures supporting the initiative (BBl 2003, 6903). Following the usual procedures, the initiative was subjected to review by the administration (BBl 2004, 4937) and the federal parliament (BBl 2005, 4039). The administration and both chambers of the parliament recommended the voters turn down the initiative (the National Council with 93:92 and the Council of States with 35:10 votes). In the official voter information magazine, the administration explained its position as follows: “The law on genetic engineering [of 2003] provides the needed protection of people, animals, and the environment. The additional regulation could damage the recognition and attractiveness of Switzerland as a location for science and business.” (Federal Chancellory 2005, p.5). A comparison of the relevant provisions of

the initiative and those of the Law on Genetic Engineering of 2003 as presented in the official voter information magazine is provided in Table 2 (Federal Chancellory 2005, p.8). Of the four large political parties only the Social Democrats endorsed the initiative.[1] On Sunday, 27 November, 2005, 1,125,357 citizens voted for and 896,372 against the initiative (BBl 2006). The initiative thus prevailed with an approval rate of 55.7 percent. This result was remarkable because it was only the 15th initiative to be approved over the 114-year history of the Swiss initiative, and it was only the second initiative to be approved by a majority of voters in every single canton (state). The lowest approval rate was observed in the city canton of Basel (50.2 percent). This was not surprising since the city of Basel is home to several large employers in the biotechnology industry, including *Syngenta*, one of the world's largest producers of agro-biotechnology.

Voter turnout was 42.3 percent. The initiative was on the ballot together with one other measure, which was about the opening of shops on Sundays.

2.2 The voter survey

As usual after national votes, a voter survey (so-called VOX survey) was conducted by the research institute gfs.bern. The computer-assisted telephone interviews were conducted within two weeks after the vote, over 90 percent of them within the first week. The following description of the sampling and survey procedure is based on Hirter and Linder (2005).

Sampling occurred through a three-stage random process. In the first stage, the population was stratified for proportional sampling among the language regions. The second stage consisted of random dialling based on the electronic list of phone lines. In the third stage, at the household level, the selected person was the one (among those with the right to vote, i.e. Swiss citizens with age 18 or higher) who has his or her birthday first in the year.

The total sample consisted of 1017 persons, including the individuals who had not participated in the vote (and thus had to complete only part of the interview). Of initially 6130 addresses, 5337 would have been eligible for an interview. Ot these 597 could not be contacted, with 1290 households there was no target person (Swiss citizen

[1] There were, however, some endorsements by cantonal, women's and youth sections of the other large parties.

with right to vote) available and 2433 target persons refused or terminated the interview. The refusal rate of 70.5 percent is typical for VOX surveys.

The voter survey addressed the following topics: (a) perceived importance of the proposition and participation; (b) formation of opinions; (c) perception of the proposition; (d) voter profile; (e) decision motives; and (f) arguments for and against the proposition. An overview of these results is presented in Hirter and Linder (2005) which is available in German, French and Italian language. The survey data with a detailed technical report of the survey (Longchamp et al. 2005) and the original questionnaire in all three languages are available from the Swiss Information and Data Archive Service for the Social Sciences (SIDOS). Many of the response variables of the survey, such as responses to topics (a), (b) and (c), are mainly of interest in broader analyses of trends in voting over time. Responses to (e) were asked in a very open question format and are therefore difficult to quantitatively analyze. (A notable result from those responses, reported in Hirter and Linder (2005), is that only six percent of those voting no mentioned benefits of GM crops for agriculture as a decision motive.)

Hence, the focus in the present paper is on the responses to questions about the topics (d) and (f). We emphasize the analysis of the socio-economic correlates of voting behaviour, as this analysis does not rely on problematic assumptions about the respondents' understanding of the survey questions or about their motivation for a considerate and truthful response.

Due to space limitations and also due to some problems with interpretation, we did not analyze the responses to all questions on the topics (d) and (f). Regarding the respondents' political preference/ideology, we analyzed the responses to five out of thirteen questions (see section 3.3). Not analyzed were the responses to questions about preferences concerning law and order, a strong army, equal opportunities, citizen participation in politics, equal rights of women, equal rights for foreigners, environmental protection *vs.* economic prosperity (since this seemed to be too directly related to the vote itself), and the distribution of power between the federation and the cantons. Regarding the respondents' agreement with pro and con arguments (see section 3.4) we analyzed the responses to four out of six questions. Not analyzed were the responses to the statement "there is no need for further regulations in the domain of genetic engineering", since the statement may not have made it clear to all respondents whether "further" was meant relative to the status before or after the referendum. Furthermore, we did not analyse the responses to "the consumers should be able to

choose freely between genetically modified and unmodified products", since those responses are difficult to interpret. They could relate either to labelling requirements or to markets that offer both non-GM and GM food.

2.3 Statistical analyses

From the original voter survey dataset with 1017 respondents, we removed those 34 individuals who did not report whether they had participated in the vote. Among the remaining 983 respondents, there were 607 who reported that they had participated in the vote. Among the 607 active voters there were 394 who reported that they had approved of the proposition (and 213 who reported that they had disapproved).

Chi-square tests were used to test the independence between approval/disapproval and (i) various socioeconomic characteristics, (ii) political/ideological positions, and (iii) agreement with various pro and con arguments. The role of these variables was further analyzed by testing the linear effect of the (ordinal) response categories in a binary (logistic) regression framework.

In addition to approval/disapproval, we also analyzed participation/non-participation in the vote. These analyses, which are not reported in detail in the results section, are available from the author on request.

3 Results

3.1 Population and sample

Sample and population means of selected variables are presented in Table 3. As usual in voter surveys, the participants of the vote are over-represented in the sample. The deviation of the proportion of (self-reported) active voters in the survey from the actual turnout was about 20 percentage points. The proportion of voters approving the initiative was 9 percentage points higher in the sample than in the population (i.e., in the official voting records). The sample is more representative with regard to the socioeconomic characteristics gender and age.

3.2 Socioeconomic characteristics

The percentage approval of the initiative for different socio-demographic and socio-economic groupings of survey respondents and for different levels of political interest is shown in Fig. 1. The categories are those of the original survey data. Individuals above the age 65 were significantly less favourable to the initiative ($\chi^2_{<2>}$=, p=0.004). Females were somewhat more favourable but this difference was not significant ($\chi^2_{<1>}$=2.03, p=0.15). The language region (German, French, Italian) did not significantly affect approval ($\chi^2_{<2>}$=3.42, p=0.18). Income was non-significant, although the highest incomes tended to be somewhat less favourable to the initiative ($\chi^2_{<4>}$=7.34, p=0.12). Educational group and community size had no effect ($\chi^2_{<2>}$=1.53, p=0.47 and $\chi^2_{<2>}$=, p=0.56, respectively). The level of self-reported political interest was significantly associated with the voter groups. The approval rate of the politically least interested group was about half as large as the approval rates of the other groups ($\chi^2_{<3>}$=8.22, p=0.04).

3.3 Political preference/ideology

Percentage approval of the initiative by important political preference/ideology variables is presented in Fig. 2. The categories are those of the original survey dataset. The responses to the question: “Do you prefer a country (Switzerland) that increasingly opens up or a country that increasingly closes itself?” did not significantly differ between the voter groups ($\chi^2_{<5>}$=6.40, p=0.27). For the responses to the question: “Would you like a country with large or income differences or a country with no income differences?” the independence was clearly rejected ($\chi^2_{<5>}$=15.90, p=0.007). Responses to the question “Do you prefer a country in which little emphasis is placed on full employment or a country in which strongly emphasizes full employment?” were not significantly different between voter groups ($\chi^2_{<5>}$=3.34, p=0.65). For the question “Would you like a country which is modern or a country which protects its traditions?” one might expect that the ‘modernists’ would be less favourable to a ban on GM plants in agriculture. However, such a relationship was not observed ($\chi^2_{<5>}$=3.09, p=0.69). The strongest association between votes and political preferences is observed for the responses to the question: “Do you prefer a country with more state interventions in the

economy or a country with more competition on the market?" ($\chi^2_{<5>}$=31.74, p=0.0001). Interestingly, this association was even stronger than the association with the preference regarding environmental protection *vs.* economic prosperity ($\chi^2_{<5>}$=18.78, p=0.021).

3.4 Agreement with arguments for or against a ban of GM plants in Swiss agriculture

The association between perceptions of the main arguments for or against using GM plants in Swiss agriculture and individual voting decisions is illustrated in Fig. 3. The null hypothesis of independence of voting and the extent of agreement with the statement could be clearly rejected in all cases. Approving voters agreed much more on the statement that "GM food is bad for your health" ($\chi^2_{<3>}$=61.1, p<0.001), that GMO-free agriculture conserves the natural diversity of plants and animals ($\chi^2_{<3>}$=65.6, p<0.001) and that "a pause for reflection in genetic engineering makes sense because many questions remain open" ($\chi^2_{<3>}$=85.7, p<0.001). On the other hand, those approving the initiative agreed much less on the statement that "the initiative threatens Switzerland as a research location" ($\chi^2_{<3>}$=101.9, p<0.001).

3.5 Logistic regression

Table 4 shows how the socioeconomic characteristics and the responses to the questions about political preference/ideology and agreement with pro and con arguments were scored to be included as explanatory variables in binary logistic regression models of the voting decision. The purpose of the regressions is to explore the *ceteris paribus* effects of the same variables as previously analyzed using chi-square tests. The simple empirical strategy is therefore to includes the three sets of variables first separately and then jointly in the binary logistic regression.

The binary logistic regression estimates (marginal effects) are presented in Table 5. The results reflect those in the unconditional (chi-square) tests. The explanatory power of the socioeconomic variables (Model 1) is very weak (McFadden's R^2 = 0.02). The effect of age and income on the probability of a yes vote is negative and the effect of education is positive. Among the political preference variables (Model 2), the preference for market vs. government control of the economy was the far most important. This latter association and the significant associations in Model 3 also remain significant in a regression including all independent variables (Model 4). The most

important determinant of the decision in the model including all explanatory variables was the perception of the moratorium's consequences for Switzerland as a research location.

4 Discussion

Our key findings are threefold. First, support of the moratorium did not differ much among different socioeconomic groups. Second, support of the moratorium was positively associated with a relatively favourable perception of the role of the state in the economy but not with traditionalist or isolationist values. Third, approval strongly depended on the extent of agreement with several pro and con arguments, most notably the one that a ban would threaten the interests of national research and industry. In the following, these findings are addressed in turn.

Regarding the first point, the results do not confirm the hypothesis that better education (and hence knowledge) will automatically enhance the support of GM crops. In fact, education had a marginally significant positive effect on the acceptance of the initiative (Table 5, model 1). Moreover, younger individuals were not less supportive of the moratorium than older individuals. In the contrary, the greatest opposition to the initiative came from voters above 65 years of age. Generational change may thus not automatically lead to less concern about agricultural biotechnology among the population.

With regard to the second result, one might have expected that approval of the ban would be associated with isolationist and traditionalist tendencies. Interestingly, rather the opposite is observed in that at least the isolationist tendencies seemed to be associated with the GMO-friendly votes (see Fig. 2). The minor role of traditional values is consistent with the absence of any effects of rural *vs.* urban residence (see community size in Fig. 1). The most important dividing line, instead, was the preference about the proper role of the state in the economy. This result lends some support to the interpretation that support of GMO production was associated with values traditionally labelled as conservative.

Concerning the third result, the major role of the perception of industry interests among the motives of disapproving voters, it is important to note that Switzerland is home to one of the world's largest producers of GM crops and agro-chemicals and thus

an important location of related private and public employment in research and development. The fact that the strongest opposition was observed in the cantons of Basel City, where that firm is located (50.8 percent yes), Zurich, which hosts substantial public employment in biotechnology research (50.5 percent yes), and the cantons of Basel Landscape (50.7 percent yes) and Aargau (50.3 percent yes), which are both located within commuting distance of both Zurich and Basel, supports the interpretation that the industry interests was the key argument against the initiative.

Since the use of GM crops in agriculture is a contentious issue world wide it is natural to ask if a similar national referendum would also have passed in other countries in Europe and elsewhere. The key role of Swiss industry interests in the Swiss vote suggests that comparable countries with less tangible industrial interests might be even more supportive of bans on GM-food production. Given the minor role of income, urban/rural gradient, and other socioeconomic dimensions, the results may be transferable to many countries at least in Europe. This conclusion is also supported by the results of the 2005 Eurobarometer survey on biotechnology (Gaskell et al. 2006; see also Gaskell et al. 2004). The survey which unfortunately does not cover Switzerland found majorities in all but a few countries opposed to agricultural – as opposed to other – applications of biotechnology. Forty-nine percent of the respondents stated that they would “definitely” or “probably” buy GM food if it were grown in a more environmentally friendly way than other foods. This result suggests that the externalities or public-good aspects of GM crops are indeed substantial. Since preferences for public goods cannot be adequately expressed in consumer choices (see Introduction), future Eurobarometer research should consider asking respondents also directly about their preferences for the public good, i.e., about a moratorium at European, national or regional levels.

On the other hand, the benefits of agricultural biotechnology may be more tangible in other countries than in Switzerland, which could positively influence the perception of the technology in those settings (Siegrist et al. 2006, p. 331). In the debates preceding the Swiss vote, it appeared to be difficult for the opponents of the ban to credibly convey that the use of GM crops in Switzerland would have benefits for producers or consumers. While the 2005 Eurobarometer study identifies a similar lack of consumer benefits in Europe, those benefits might increase with future technological advances, and they may be more tangible in other countries. Finally, great caution should be exercised in extrapolating the Swiss results to countries with a different

cultural background or to developing regions where more immediate needs may override health concerns as well as concerns about the authenticity of food and agricultural environments.

A final point of discussion regards the opposition of the moratorium by the executive and legislative branches of government. It has been suggested that consumer attitudes about agricultural biotechnology may have been exacerbated by overly cautious and restrictive public policies (see e.g. Lusk et al. 2006, p. 19). The Swiss case does not support this interpretation. The government was opposed to the ban and would have left the approval of first commercial applications up to routine agency decision-making according to the provisions of the law on genetic engineering of 2003 and the related government orders. It was clearly the population, and notably consumer and environmental groups, who were concerned about negative externalities of the commercial cultivation of GM crops in Switzerland and thus initiated the collective decision.

5 Conclusions

While much effort has been devoted to estimating market premiums for non-GM food, the results of that research are silent about the preferences for the public good aspects, or externalities, of GM food production. For public goods, the closest substitute of private consumption decisions is voting on referenda. In Switzerland, a majority of the voters recently approved a voter initiative for a 5-year ban on the use of GM crops in agriculture against the preferences of both the executive and legislative branches of government. Two key conclusions emerge from the present analysis of voting. First, concerns about the use of genetically modified crops in agriculture may not automatically vanish with increasing levels of education or generational change. Second, the determinants of voting suggest that a majority of citizens in many other countries with less pronounced industry interests in agricultural biotechnology would pass similar bans if their constitutions provided the opportunity for voter initiatives.

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Table 1. Empirical studies on consumer demands for non-GM food and GM-free food production

	Private-good or market values of non-GM food	Values for labelling policies	Public-good or non-market values of GM-free production
Hypothetical	Many studies, see meta-analysis by Lusk et al. (2005)	Loureiro and Hine 2004, Carlsson et al. 2007[a]	Carlsson et al. 2007[a]
Actual	Many studies, see meta-analysis by Lusk et al. (2005)	No study to date	Present study

[a] Carlsson et al. 2007 try to separate public-good benefits by including associated public goods among the attributes of beef and chicken products.

Table 2. Comparison of the initiative with the status quo regulation as illustrated in the voter information magazine (Federal Chancellory 2005, p.8) (translated from German)

Juxtaposition of the popular initiative and the law on genetic engineering

(GMO = genetically modified organisms)

	Initiative	Current regulation in the law on genetic engineering	Current situation (in September 2005)
Cultivation of GMO plants	forbidden for five years	possible after a strict examination procedure (including field trials)	no cultivation; no ongoing examination procedure
Use of GMO livestock in agriculture	forbidden for five years	forbidden	none
Import of GMO food	*	possible after authorization; labelling mandatory	few food imports with GM ingredients
Import of GMO fodder	*	possible after authorization; labelling mandatory	few fodder imports with GM components
Field trials	*	possible after permission	field trials conducted at the ETH

*Not regulated by the initiative; in these domains the current regulation would remain relevant also if the initiative is approved.

Table 3. Sample and population statistics (percentages)

Group	Respondent sample (n=983)	Voter sample (n=607)	Population [b] (n=4,860,000)
Active voters	61.7	100	42.3
Approving voters	–	64.9	55.7
Male	49.1	49.6	47 [a]
Age 18-40	35.4	27.4	36 [a]
Age 41-65	43.0	47.6	42 [a]

[a] Based on census statistics for the year 2000 cited in Longchamp et al. (2005).
[b] Swiss nationals with right to vote.

Table 4. Variable definitions and descriptive statistics

Variable	Description	Mean	St. dev.[a]	N
Age	Age (0=18–39; 1=40–65; 3=above 65)	0.977	0.724	607
Income	Income (0=less than 3,000; 1=3–5,000; 2=5-7,000; 3=7-9,000; 4=above 9000 CHF per month)	2.078	1.240	528
Gender	Gender (1=male, 0=female)	0.496	0.500	607
Education	Education (0= low; 1= medium; 2= high)	1.422	0.640	607
Language	Language (0=German; 1=French or Italian)	0.320	0.557	607
Townsize	Community size in 1000 inhabitants (0=less than 2; 1=2–10; 2=above 10)	1.216	0.754	607
P_Open	Response to “Do you prefer a country (Switzerland) that increasingly opens up or a country that increasingly closes itself?” (0=close; 5=open up)	3.832	1.329	594
P_Distribution	Response to “Would you like a country with large or income differences or a country with no income differences?” (0=small; 5=large)	2.019	1.484	588
P_Employment	Response to “Do you prefer a country in which little emphasis is placed on full employment or a country in which strongly emphasizes full employment?” (0=little emphasis; 5=much emphasis)	3.846	1.557	592
P_Modern	Response to “Would you like a country which is modern or a country which protects its traditions?” (0=traditional; 5=modern)	2.246	1.334	598
P_Market	Response to “Do you prefer a country with more state interventions in the economy or a country with more competition on the market?” (0=state; 5=market)	3.195	1.741	575
A_Health	Agreement with “GM food is bad for your health” (0=not agree at all; 3=fully agree)	1.773	1.038	436
A_Diversity	Agreement with “GMO-free agriculture conserves the natural diversity of plants and animals” (0=not agree at all; 3=fully agree)	2.427	0.895	558
A_Research	Agreement with “The initiative threatens Switzerland as a research location.” (0=small; (0=not agree at all; 3= fully agree)	1.330	1.168	558
A_Pause	Agreement with “A pause for reflection in genetic engineering makes sense because many questions remain open.” (0=not agree at all; 3= fully agree)	2.273	1.074	586

Table 5. Logistic regression estimates[a]

	(1)		(2)		(3)		(4)	
Variable	ME [b]	t-ratio	ME [b]	t-ratio	ME [b]	t-ratio	ME [b]	t-ratio
Constant	0.2162	2.89***	0.3608	3.26***	-0.2632	-2.45	-0.2061	0.81
Age	-0.0757	2.53**					0.0022	0.05
Income	-0.0383	2.10**					-0.0015	0.05
Gender	-0.0700	1.60					-0.0607	0.87
Education	0.0606	1.69*					0.0606	0.98
Language	0.0607	1.51					0.0002	0.00
Townsize	0.0011	0.04					-0.0174	0.38
P_Openness			0.0317	1.93*			0.0262	0.93
P_Distribution			-0.0358	2.43**			0.0145	0.58
P_Employment			-0.0088	0.62			0.0090	0.39
P_Modern			-0.0209	1.29			-0.0366	1.46
P_Market			-0.0603	4.60***			-0.0564	2.57**
A_Health					0.0711	2.29**	0.0859	2.16**
A_Diversity					0.0916	2.60**	0.0973	2.38**
A_Research					-0.1155	4.67***	-0.1185	4.00***
A_Pause					0.0930	3.43***	0.0912	2.79***
Log-likelihood	-337.4		-332.1		-200.5		-152.9	
Log-l. restr.	-345.5		-350.5		-253.9		-206.4	
χ^2	16.28		36.7		106.9		107.2	
Sig. level	0.012		<0.001		<0.001		<0.001	
N	528		534		386		310	
McFadden's R^2	0.023		0.052		0.210		0.259	

Note: t-ratios in parentheses; *, **, *** denote significance at the 0.1, 0.05, and 0.01 levels, respectively.

[a] The dependent variable is the binary voting decision (yes votes coded 1).

[b] Marginal effects on Prob(yes) computed at the means of the independent variables.

Figure legends

Figure 1 Percentage yes in the survey by socioeconomic characteristics.

Figure 2 Approval yes in the survey by political preference/ideology.

Figure 3 Approval yes in the survey by agreement with pro and con arguments.

Figure 1

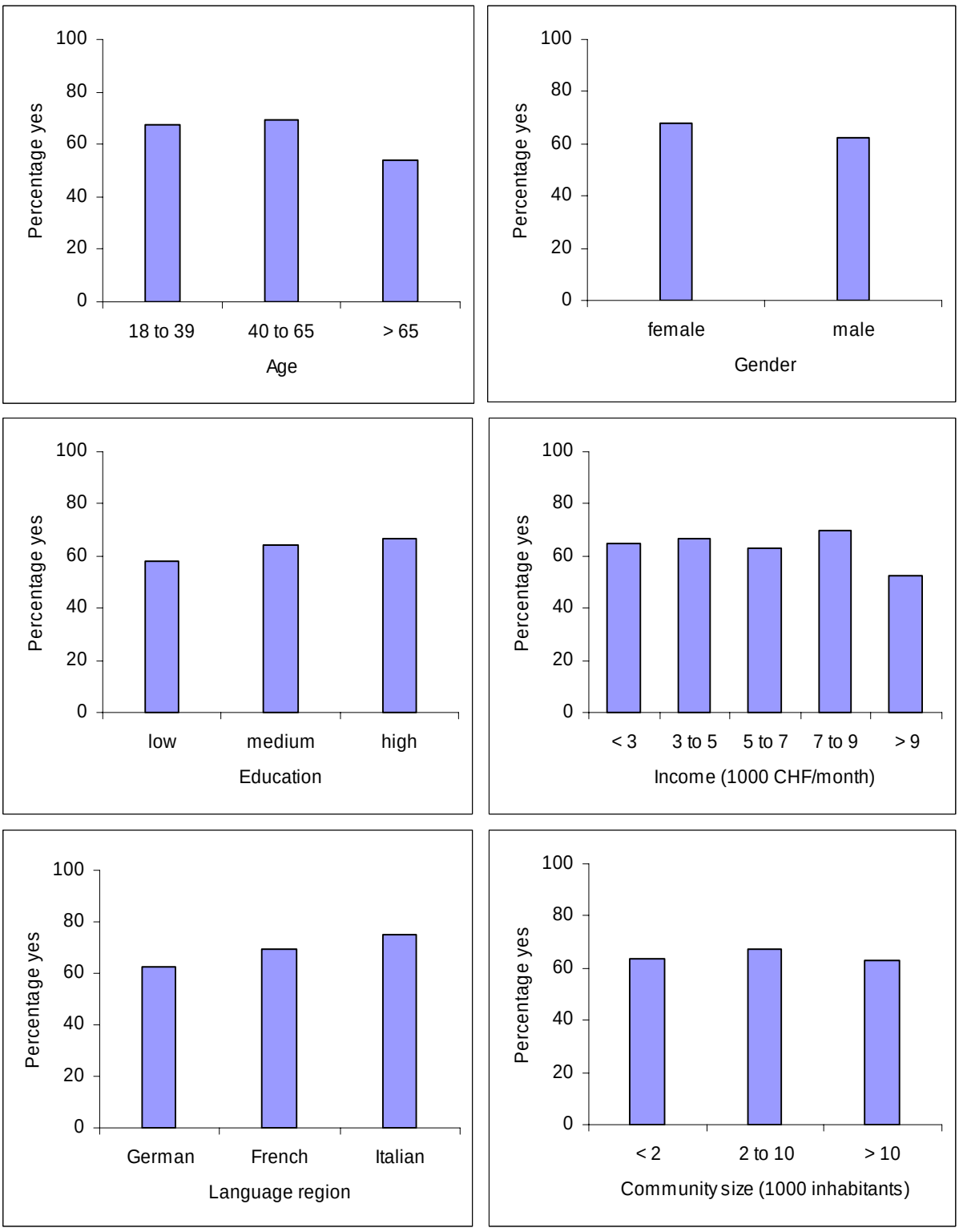
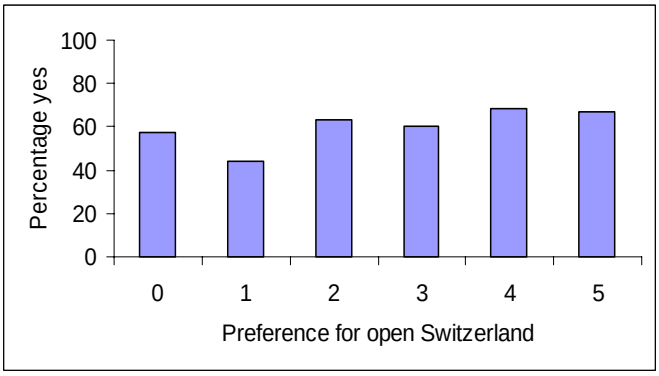
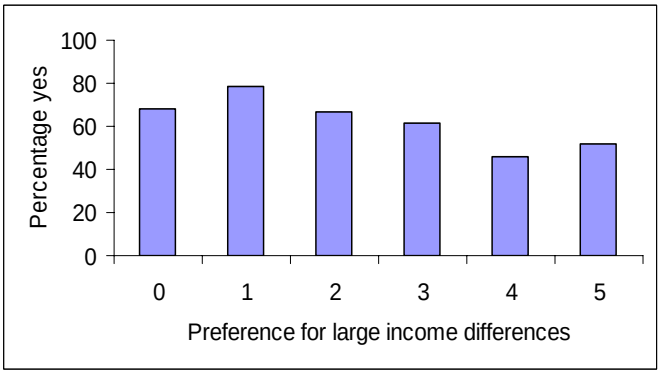
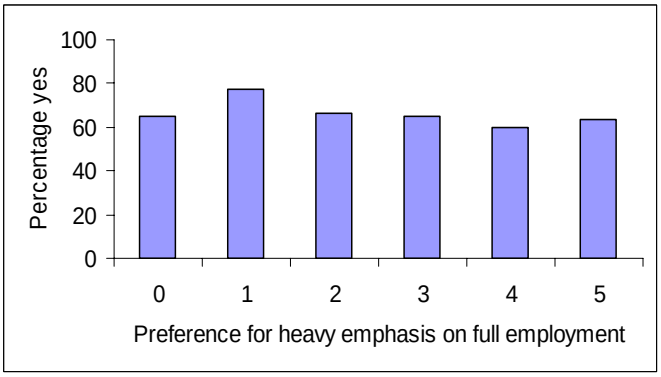
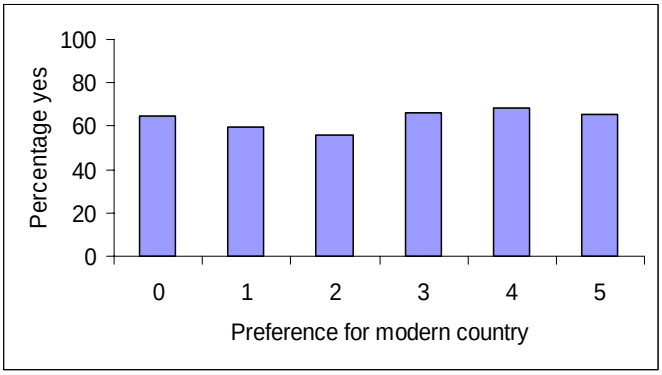

Percentage yes
100
80
60
40
20
0
18 to 39
40 to 65
> 65
Age
female
male
Gender
low
medium
high
Education
< 3
3 to 5
5 to 7
7 to 9
> 9
Income (1000 CHF/month)
German
French
Italian
Language region
< 2
2 to 10
> 10
Community size (1000 inhabitants)

Figure 2


Percentage yes
100
80
60
40
20
0
0
1
2
3
4
5
Preference for open Switzerland


Percentage yes
100
80
60
40
20
0
0
1
2
3
4
5
Preference for large income differences


Percentage yes
100
80
60
40
20
0
0
1
2
3
4
5
Preference for heavy emphasis on full employment


Percentage yes
100
80
60
40
20
0
0
1
2
3
4
5
Preference for modern country

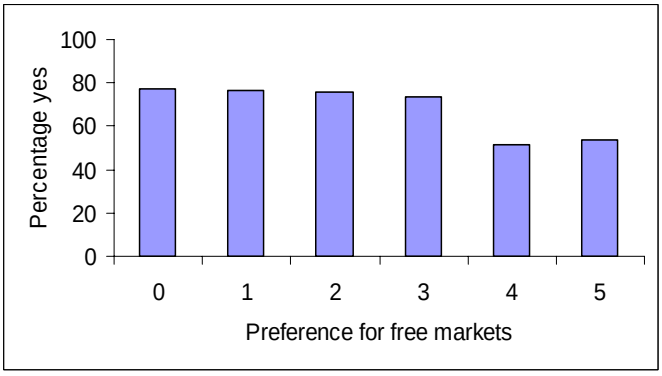
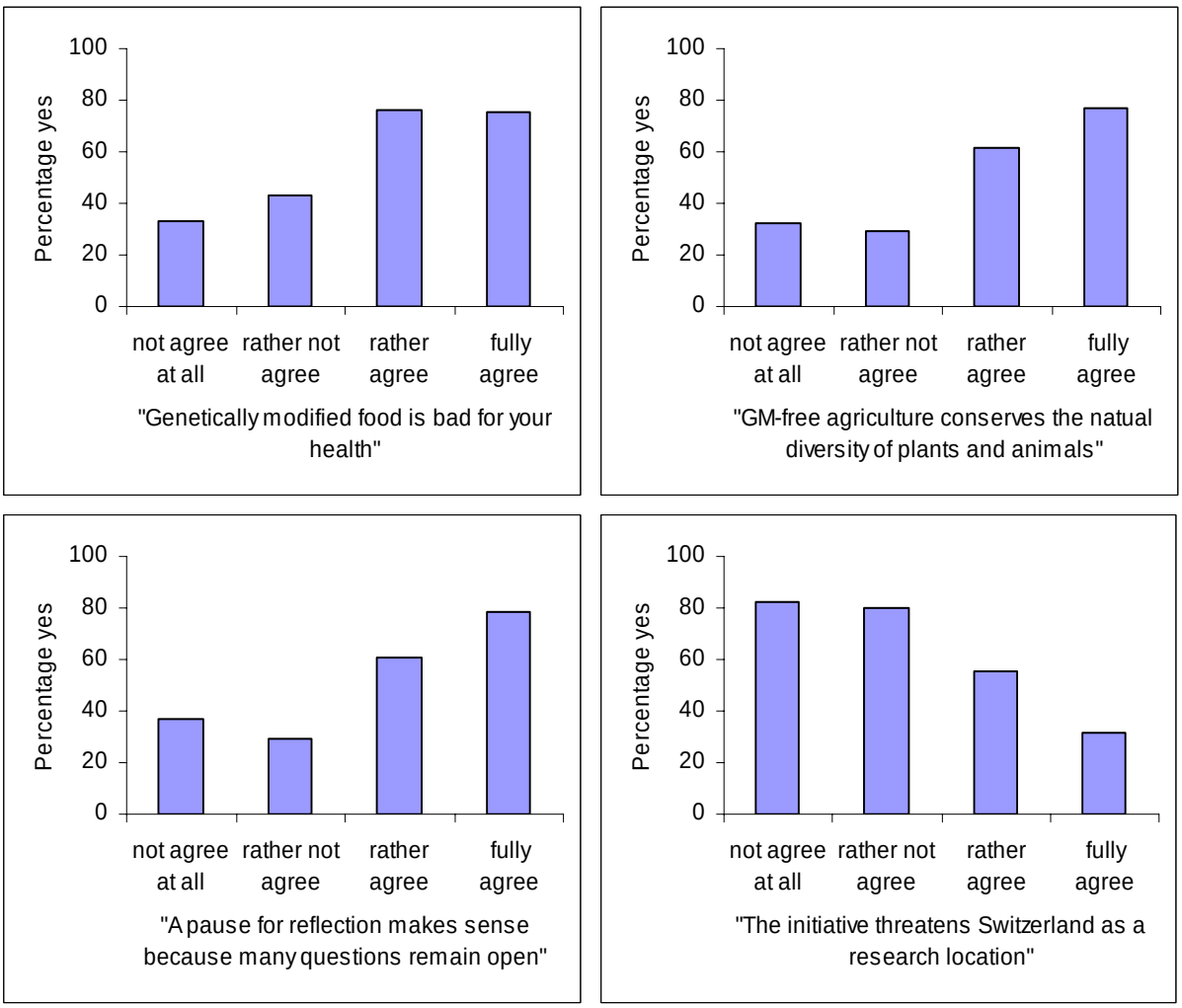

Percentage yes
100
80
60
40
20
0
0
1
2
3
4
5
Preference for free markets

Figure 3


Percentage yes
100
80
60
40
20
0
not agree at all
rather not agree
rather agree
fully agree
"Genetically modified food is bad for your health"
"GM-free agriculture conserves the natual diversity of plants and animals"
"A pause for reflection makes sense because many questions remain open"
"The initiative threatens Switzerland as a research location"

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